The Claims

What is claimed is:

1. A method for dispensing a beverage with two or more superimposed liquid layers in a container, which comprises:

providing at least one source of first liquid concentrate and at least one source of second liquid concentrate;

pumping a metered amount of the first liquid concentrate from the source and delivering it into a containter to provide a first liquid layer therein;

pumping a metered amount of the second liquid concentrate from the source, mixing it with a metered amount of water to form a second, diluted liquid layer from the second concentrate, and delivering the diluted second concentrate into the container and first liquid layer to form a second liquid layer;

wherein the second liquid layer is diluted to a density that is lower than that of the first liquid layer so that the first and second layers form a stable layered arrangement in the container with the second, diluted liquid layer of lower density remaining spatially above the first liquid layer to provide a beverage having a visually distinct upper layer upon a lower layer in the container.

2. The method according to claim 1, wherein the first liquid layer is obtained by mixing the metered amount of first liquid concentrate with a metered amount of water and wherein the density variation between the first and second liquid layers is set by controlling the concentrate-to-water dilution ratio of the first liquid layer with respect to the concentrate-to-water dilution ratio of the second liquid layer.

3. The method according to claim 2, wherein the density variation between the first and second liquid layers in the container is controlled to be equal to or higher than 0.1%.

4. The method according to claim 3, wherein the density variation between the first and second liquid layers in the container is controlled to be comprised between 0.1 and 40%.

5. The method according to claim 1, wherein the first and second liquid layers are delivered in a gentle manner without causing significant turbulence in the container..

6. The method according to claim 5, wherein the metered amounts of dilution water provide flow rates to dilute and mix respectively with the amounts of first and second concentrates are each set to not exceed 20 mL/s for a container size of between 50 and 500 ml.

7. The method according to claim 6, wherein the water flow rates are between 5 and 10 mL/s.

8. The method according to claim 5, wherein the dilution water to dilute and mix respectively with the amounts of first and second concentrates are each set to have a flow linear velocity that does not exceed 120 cm/s.

9. The method according to claim 8, wherein the flow linear velocity is between 30 and 100 cm/s.

10. The method according to claim 1, wherein a pause is provided between the pumping of the first concentrate and the pumping of the second concentrate.

11. The method according to claim 1, wherein

during or after delivering the first liquid layer, a metered portion of concentrate is mixed with water and further whipped to deliver foam directly onto the first liquid layer so as to slow down the delivery of the second liquid layer to the container.

12. The method according to claim 2, wherein the concentrate and dilution water for the first and second liquid layers form concentrate-to-water dilution ratios that are adjusted relative to each other to provide a temperature difference between the first and second layers in the container of at least 5% with the second layer having a higher temperature than the first layer.

13. The method according to claim 1, wherein the first and second concentrates have different visual and taste attributes.

14. The method according to claim 1, wherein the first and second concentrates have a different intrinsic density and different initial solids contents.

15. The method according to claim 14, wherein the first liquid concentrate is a milk based concentrate having between 15 to 33 wt.% total solids and a specific gravity of between 1.01 to 1.15 g/mL.

16. The method according to claim 16, wherein the second liquid concentrate is a coffee based concentrate having between 45 to 60 wt.% total solids and a specific gravity between 1.05 to 1.28 g/mL.

17. The method according to claim 16, wherein the amount of milk concentrate to water is present at a ratio that does not exceed 1:3 and the amount of coffee concentrate to water is is present at a ratio that is equal to or higher than 1:5.

18. The method according to claim 1, which further comprises pumping a metered amount of a third liquid concentrate from a source, mixing the metered amount of liquid concentrate with water, and delivering a third diluted liquid layer into the container; wherein the density of the third layer is set lower than the density of the first layer but higher than the density of the second layer.

19. The method according to claim 18, wherein the mixing and delivery of the diluted third concentrate is controlled to at least partially overlap with the delivery of the diluted first and/or second concentrates.

20. The method according to claim 18, wherein the delivery of the third concentrate is controlled to follow the delivery of the first layer from the first concentrate but to precede the delivery of the diluted second concentrate.

21. The method according to claim 1, wherein the third concentrate is a liquid sweetener.

22. The method according to claim 1, wherein the at least first and second concentrates are selected from the group consisting of coffee, milk, cocoa, sugar, micronutrients, fruits, plant extracts and combinations thereof.

23. A dispensing device for automatically dispensing a beverage having a distinctive visual appearance of multi-layers in a serving container, comprising:

at least one mixing means;

a water supply and a water transport and metering means to transport and meter water to the mixing means;

at least first and second liquid concentrates individually contained in storage means;

concentrate lines and transport and metering means configured to transport and meter each concentrate individually from the storage means to the mixing means;

at least one delivery line with an outlet to discharge amounts of the mixed and diluted concentrates in a serving container;

control means including a user input means and a controller that selectively control the activation of the transport and metering means according to a programmed cycle corresponding to the specific user input means activated by the user;

characterized in that:

the control means selectively activates the water and concentrate transport and metering means for the mixing and delivery of a metered amount of a first concentrate with a metered amount of water to form a first liquid layer and, subsequently the mixing and delivery of a metered amount of a second concentrate with a metered amount of water to form a second liquid layer;

wherein the water and the first and second liquid layers respectively have concentrate-to-water dilution rates that are controlled one relative to the other in a manner to adjust the density of the first liquid layer at a higher value than that of the second liquid layer so that the first and second layers form a stable layered arrangement in the container with the second, diluted liquid layer of lower density remaining spatially above the first liquid layer to provide a beverage having a visually distinct upper layer upon a lower layer in the container.

24. The dispensing device according to claim 23, wherein the concentrate-to-water dilution rates of the first and second layers are controlled to adjust a density variation between the first and second liquid layers in the container to be equal to or higher than 0.1%.

25. The dispensing device according to claim 23, wherein the first and second liquid layers are discharged through the outlet at a linear velocity of 120 cm/s or less for a container size of between 50 and 500 ml.

26. The dispensing device according to claim 23, which further comprises a whipper which is activated on by the control means to foam a metered amount of concentrate during or after the first liquid layer is delivered and before the discharge of the second liquid layer is delivered in order to produce a surface foam layer upon the first layer which slows down the delivery of the second layer in the container before it comes in contact with the first liquid layer.

27. The dispensing device according to claim 26, wherein the whipper is activated to foam an end portion of the amount of first concentrate diluted with water to deliver the foamed layer.

28. The dispensing device according to claim 26, wherein the whipper is activated to rotate from 10,000 to 50,000 rpm.

29. The dispensing device according to claim 24, wherein the concentrate lines and water line have internal diameters that are differentially sized to control the concentrate and water flow rates according to the concentrate density difference of the first and second layers required for forming stable liquid layers.

30. The dispensing device according to claim 24, wherein the first concentrate is a milk concentrate.

31. The dispensing device according to claim 24, wherein the second concentrate is a coffee concentrate.

32. The dispensing device according to claim 24, wherein the control means is programmed to sequence the delivery of the first and second liquid layers by pumping successively first concentrate and second concentrate with a pause in-between of between 2 to 10 seconds.

33. The machine readable program installable on a processor or microprocessor comprising:

means for receiving a beverage selection entered by the user through user input means,

means for actuating a water delivery means at at least one programmed water flow rate and during at least one programmed water time sequence,

means for actuating a first concentrate delivery means at a programmed first concentrate flow rate and at a programmed first concentrate delivery time, wherein the water flow rate, water providing time sequence, first concentrate flow rate and first concentrate delivery time are parameters which are adjusted in relation together to deliver a first diluted liquid layer from the first concentrate into the container at a predetermined first concentrate-to-water dilution ratio,

means for actuating a second concentrate delivery means at a second concentrate flow rate and at a programmed second concentrate delivery time, wherein the water flow rate, water time sequence, second concentrate flow rate and second concentrate delivery time are parameters which are adjusted in relation together to deliver a second diluted liquid layer from the second concentrate into the container at a predetermined second concentrate-to-water dilution ratio, and

means for providing the first and second dilution ratios at predetermined values so that the resulting density of the first liquid layer is higher than the resulting density of the second liquid layer.

34. The machine readable program of claim 33 further comprising means for accessing a timer in signal communication with the processor or microprocessor and means for actuating the water delivery means according to the programmed water time sequence and for actuating the concentrate delivery means according to the programmed first and second concentrate delivery times in order to deliver the first and second layers at the predetermined first and second concentrate-to-water ratios.

35. The machine readable program according to claim 34 further comprising means for actuating a whipper at a predetermined whipping speed for whipping an amount of the first and/or second concentrate and enabling delivery of a foamed layer.